

## CLAIMS

What is claimed is:

1. A perpendicular magnetic recording medium, comprising:  
a nonmagnetic substrate;  
an underlayer deposited on the nonmagnetic substrate;  
a magnetic recording layer formed on the underlayer, quickly heated, and quenched;  
a protective layer deposited on the magnetic recording layer; and  
a liquid lubricant layer deposited on the protective layer, to improve an uniaxial anisotropy  $K_u$  and a coercive force  $H_c$  of the magnetic recording layer.
2. The perpendicular magnetic recording medium according to claim 1, wherein, according to a following order, the underlayer deposited on the nonmagnetic substrate, the magnetic recording layer formed on the underlayer, the protective layer deposited on the magnetic recording layer, and the liquid lubricant layer deposited on the protective layer are sequentially carrying out.
3. The perpendicular magnetic recording medium according to claim 1, wherein the underlayer is formed of a metal or alloy material having a hexagonal closest-packing structure having an a-axis lattice constant greater than 100% and less than or equal to 120% of the a-axis lattice constant of the magnetic recording layer.
4. The perpendicular magnetic recording medium according to claim 1, wherein the underlayer is formed of a metal or alloy material having a face-centered cubic lattice structure having an (a-axis lattice constant)  $\times 1/\sqrt{2}$  greater than 100% and less than or equal to 120% of the a-axis lattice constant of the magnetic recording layer.
5. The perpendicular magnetic recording medium according to claim 1, wherein the quickly heating of the magnetic recording layer comprises increasing a temperature of magnetic recording layer by 100°C to 400°C at a rate of 10°C to 35°C /min.
6. The perpendicular magnetic recording medium according to claim 3, wherein said metal or alloy material comprises Ru, Ti, TiCr, Re, CoCr, CuZn, IrMo, Ir<sub>2</sub>W, MoPt, or MoRh<sub>2</sub>.

7. The perpendicular magnetic recording medium according to claim 3, wherein the metal or alloy material comprises Pd, Cu, Au, Ir, Pt, Rh, Ag, Ni<sub>3</sub>Al, or Co<sub>3</sub>Ti.